Museum Flood Area
Frequently Asked Questions
September 28, 2021

Summer of 2021 Rainfall & Flood Events

Q: How active was the 2021 monsoon season?

A: According to the National Weather Service, the 2021 Monsoon Season to date (technically ends September 30th) was the 15th wettest on record with 10.54" at the Flagstaff Airport compared to the average of 7.7". Rainfall amounts across Flagstaff were pretty variable with between 10.0" – 12.5" total inches. The distinguishing characteristic of this season was the size of the storms, many of which were very large and intense.

Q: How many rainfall events resulted in flooding in the Museum Flood Area?

A: The Museum Fire burn scar experienced five rainfall events that resulted in flooding downstream that exceeded the City's stormwater system. A table of those rainfall events and the general rainfall recurrence interval table are below:

Museum Burn Scar Precipitation Events with Public Notifications					
	Rainfall Totals (Inches)				
Rainfall Event Date	Maximum 15-Minute	Maximum 60-Minute	Daily	60-Minute Interval	Did Flow Exceed Channel Within Flagstaff?
7.13.2021	1.02	1.81	2.17	25-Year Event	Yes
7.14.2021	0.67	1.15	1.22	10-Year Event	Yes
7.16.2021	0.63	1.38	1.42	10-Year Event	Yes
7.21.2021	0.60	1.26	1.26	10-Year Event	Yes
7.25.2021	0.60	0.60	0.60	2-Year Event	No
8.17.2021	1.14	3.07	3.35	200-Year Event	Yes

General Rainfall Recurrence Interval Precipitation Totals (Inches)				
	2 Year	10-Year	25 Year	100 Year
15-Minute	0.5	0.9	1.1	1.5
60-Minute	0.9	1.5	1.9	2.5
6-Hour	1.4	2.0	2.5	3.2

The largest rainfall and flood event experienced was on August 17th and the peak depth of flow at the Linda Vista / Spruce Wash Gauge was between 5 and 6 feet deep. As shown above, this was a 200-year rainfall event and the floodwater resulting from a burn scar is typically 6 to 10 times greater than pre-wildfire conditions, which is what is being experienced in the Museum Fire Flood Area. Further

information is available regarding the 2021 Museum Rainfall and Flood Events at www.coconino.az.gov/MuseumFire/FloodArea.

Q: What caused the flooding in the Museum Flood Area on August 17, 2021?

A: The flooding in the Museum Flood Area was caused by the largest rainfall event to date over the Museum Fire Burn Scar. The gauges located throughout the burn scar recorded hourly rainfall as follows: 3.07 inches in south gauge, 2.4 inches in western gauge, 1.5 inches in the eastern gauge, .75 inches at northern gauge. In addition, the rainfall was intense with over 1.14 inches recorded in at the south and west gauges in 15 minutes and 1.06 inches recorded at the east gauge. Not only was significant rainfall experienced on the burn scar itself, but also in the Sunnyside neighborhood. In an hour, 1.22 inches fell at Linda Vista. The rainfall recorded at the south gauge equates to a 10-year rainfall event.

The rainfall over the entirety of the burn scar, combined with the significant rainfall in the neighborhood, resulted in flooding that closed roads and overtopped mitigation. Significant debris was seen in the storm water given that a large area of the burn scar had not previously experienced heavy rainfall.

Q: Was the flooding in the Forest Hills neighborhood caused by runoff from the Museum Fire Burn Scar?

A: No. It is very important to understand that this flooding was not a result of the Museum Fire Burn Scar, but a separate rainfall event outside of the burn scar.

Q: What was the size of the storm that impacted the Forest Hills neighborhood, and what was the resultant damage?

A: Based on the weather radar, this appears to have been a near 300- to 400-year rainfall event that severely impacted the Forest Hills area watershed. It is estimated that the Rio de Flag ran at 1,451 cubic feet per second with a depth of over 3 feet at Boldt Drive in Cheshire at the height of this event, which was extremely dangerous and damaging. A home in Forest Hills was destroyed by the flooding when 4 feet of floodwater went through the entire home. Two other homes received several inches of floodwater. The County immediately deployed Public Works crews to address impacts to the roadway and to begin installing mitigation in the Forest Hills area.

Q: What caused the flooding in the Museum Flood Area on July 13, 2021?

A: This flooding was caused by the first significant monsoon storm to hit the Museum Burn Scar since the Museum Fire in July 2019. More than 0.75 inches of rain fell in 15 minutes over the Museum Fire burn scar, which triggered an Emergency Notification Alert to be issued to the entire Museum Flood Area. This area includes Mt. Elden Estates, Paradise, Grandview, and the Sunnyside area. Flows in

the channel overtopped the roadway at Linda Vista Drive and Cedar Ave. Street crews closed this section of Linda Vista and Cedar Ave. Fast-moving floodwaters and debris in flows approximately one foot deep were reported in the Sunnyside area running curb-to-curb on Main Street. Streets impacted due to flooding include Linda Vista, Main, Rose, Grandview, 4th Street, and Route 66. For more information, please visit https://www.coconino.az.gov/CivicAlerts.aspx?AID=2498.

Q: What were some of the impacts from this year's Museum Area flooding?

A: The Museum Area flooding in summer 2021 was unlike anything experienced in Coconino County since the post-wildfire flooding after the Schultz Fire in 2010. As we learned from this experience (and have shared repeatedly with Museum Flood Area residents before monsoon season), the threat of flooding is real, and the Museum Flood Area will remain at high risk for post-wildfire flooding for many years.

The 2021 monsoon season rain events (significant flood events on July 13, 14, 16, 21 and August 17) on the Museum Fire burn scar over July and August resulted in significant flooding and major impacts to homes and businesses. As of September 2021, the impact metrics of Museum Flood Area flooding during the 2021 monsoon season include the following:

- Interior flooding in 53 homes and 2 businesses. The total estimated damage to the homes and businesses with interior flooding is $923,000.
- 42 homes experienced exterior damage from flooding totaling $383,000 in damages.
- The Flood Control District (District) has spent in excess of $1.35 million and the City of Flagstaff (City) has spent about $1 million responding to the Museum flooding impacts.
- The City of Flagstaff has sustained over $845,000 in damage to its public infrastructure (drainage system, stormwater system and roads) within the Museum Flood Area.
- Over 10,000 tons of sediment and debris transported to Cinder Lake Landfill.
- Over 700,000 total sandbags and 7,700 lineal feet of barrier have been installed in the Museum Flood Area.

Q: Did the District and City intentionally convey floodwater down Grandview Avenue?

A: No. It is important that myths and rumors are addressed as we work together through this difficult disaster. A myth that has been promoted is that the District and City are "pushing water down Grandview" or "using Grandview as a conveyance." The flood hazard mapping that was done in 2019

clearly identified Grandview as a natural flood path in addition to the City-constructed channel. It was completely clear that with a 2” storm (25-year interval post-wildfire) floodwater would:

- overtop the culvert at Linda Vista
- overtop the channel between the top of Paradise through the entire length of the channel system including all the inlets at Dortha and Arroyo Seco, and
- extend all the way through Sunnyside and over Rt. 66.

Grandview is the low point and thus water is naturally flowing there given the topography. And more recently during large events it has even moved beyond the corner of Grandview and Linda Vista and flooded down West Street.

With the results of the flood hazard analysis in 2019 it was clear that Grandview would be a major conveyance of water, so the County and City worked to share this information with property owners during the numerous personal and community meetings. The District mobilized resources to work with property owners to mitigate the homes and businesses along Paradise, Grandview, Monte Vista, Cedar, Main, Rose, and further south and to the east and west given the results of the study. Cooperator Agreements were secured from the vast majority of properties and the mitigation was installed by residents, property owners, the District, and volunteer resources. Given this year’s monsoonal rainfall it is now clear that without this mitigation many, many more homes would have been impacted and much more significantly damaged by the severe and repetitive flooding characteristically associated with post-wildfire flooding that we experienced this monsoon season.

This was a very difficult summer for everyone living in the Museum Flood Area. The District and City understand that the trauma, anxiety, and concerns of residents following the torrential flooding events of 2021 will not end with the conclusion of monsoon season. There is no “silver bullet” solution to this flooding, and the development of long-term flood mitigation will be a very long process involving the District, City, stakeholders, and community. However, just as the threat of flooding will exist for years to come, so will the commitment of the District and City to our friends, neighbors, and families in the Museum Flood Area.

Service Requests

Q: How are flood-event service requests managed?

A: First, some understanding about the role of the Call Center and what occurs when you call to request support with sandbags, a mitigation site assessment, or debris removal. The persons that staff the Call Center can provide general information but primarily their role is to document requests for services. The County has a software system that is used to record the requests and the details of those requests. Those requests are then sorted and provided to a set of persons who set up the logistics to respond to those requests.

The requests that are made by those that are elderly and / or disabled (AFN) and from within the Museum Flood Area are managed by the District /County staff who assign Conservation Corps crews or other resources to complete these requests as crews are available. It has been extremely difficult to secure crews this summer given a number of issues outside of the control of the District and our partners, both the Arizona Conservation Corps and the American Conservation Experience. The good news is we have been able to overcome these difficulties and currently there are no outstanding sandbag requests and one outstanding debris removal request. Again, as resources are available from the AZCC we will fulfill those requests. County Public Works will contact these four outstanding requests to update the status with you.

With regard to service requests from residents that are NOT elderly or disabled (non-AFN) and are within the Museum Flood Area, these requests are again coordinated largely by the District. The District has an agreement with United Way of Northern Arizona (UWNA), which recruits for and organizes volunteers to perform these services working in conjunction with an engineer or other staff person that oversees the work. To date United Way has mobilized over 800 volunteers to address these needs, which we are grateful for our community's response and support. Currently there are no outstanding the non-AFN sandbag requests and 3 debris removal requests. These requests will be addressed as volunteers are available. United Way is continuously reaching out for volunteers so please refer anyone interested in volunteering to https://uwna.volunteerhub.com/. The City of Flagstaff and United Way are also planning a volunteer event for Saturday, October 16th. Please encourage those you know to contact United Way to sign up to assist on that day or at any time.

With regard to mitigation site assessments, those are recorded by the Call Center and referred to District and City on-call engineers or staff that will conduct the site assessments. At this time, there are six outstanding site assessments in the Museum Flood Area.

Q: How can I get a copy of my damage assessment?

A: The City's Building Department has completed numerous damage assessments throughout the Museum Flood Area within the City. If you would like a copy of your damage assessment, then please send a request to apalmer@flagstaffaz.gov.

Long-Term Flood Mitigation

Q: What long-term flood mitigation projects have been constructed for the Museum Flood Area?

A: Since 2019 the District and City have completed several projects to stabilize alluvial fans, reduce downstream sediment, and improve channel capacity to convey floodwater more safely through neighborhoods. For more information, please visit www.coconino.az.gov/MuseumFire/FloodArea.

Q: What were the results from the Museum Long-Term Mitigation Engineering Summit?

A: On August 26 & 27, 2021 more than 50 engineers & government officials met on Thursday and Friday for a Museum Flood Area post-wildfire engineering summit to brainstorm long-term mitigation options for the Museum Flood Area. For mor information please visit www.coconino.az.gov/MuseumFireFloodArea.

Q: What are some of the potential long-term flood mitigation opportunities for the Museum Area that were discussed at the Engineering Summit?

A:
The District and City held an engineering summit on August 26th and 27th focusing on identifying and discussing potential conceptual level Museum long-term flood mitigation. Over 50 engineers and other experts gathered to discuss the dynamics and condition of this watershed, and obstacles and opportunities for flood mitigation. A report out was provided at the end of the Summit, which can be accessed at www.coconino.az.gov/MuseumFire/FloodArea.

Some have asked if we have reached out to other areas experiencing post-wildfire flooding. The District has done so over many years given the experience with the Schultz Flood Area and are applying any lessons learned. More recently, though the District is now being contacted by those areas given our extensive experience with Schultz, Slide, and now Museum Flood Areas. That said we are identifying counties that are or will be impacted by post-wildfire flooding with the goal of generating support for federal flood mitigation funding.

Overall, the Summit identified four key priorities:

1) Evaluate Need for Additional Forest Restoration. Evaluate the need to complete forest restoration on the remaining unburned portion of the Spruce Avenue watershed given only 52% of that watershed burned in 2019. Obviously if further high intensity burning of the watershed takes place, then this may further compromise any efforts downstream to reduce sediment and to mitigate the flooding. Meetings are being held now involving the U.S. Forest Service, City of Flagstaff, and the Flood Control District to determine which acres remain at high risk for wildfire and then those acres will be added to the current flood modeling to determine the level of impact. If there is a significant impact, then conducting thinning on those remaining acres must be prioritized and pursued. A complicating factor is that the road into this area has been destroyed in several locations by the flooding so an investment would need to be made not only in forest restoration but likely also in road reconstruction.

2) Reduce Sediment Production and Transport. An overarching and major issue with developing long-term mitigation projects is the impact from sediment coming from the burn scar and the

channels eroding downstream of the burn scar. Long-term mitigation projects constructed within the City will not be successful in mitigating some level of the floodwater impacts unless the level of sediment is reduced, and likely reduced to some significant level. Otherwise, those measures will just fill with sediment thus eliminating the benefit of any added floodwater capacity. The District has contracted with Natural Channel Design and J.E. Fuller Hydrology to conduct studies of the estimated sediment production from the burn scar and downstream eroding channels. Natural Channel Design will also evaluate how much sediment they believe can be arrested / deposited above the City by stabilizing the alluvial fans (wide, flatter areas where floodwater slows down and drops out some of the sediment / debris) and to some extent, stabilizing the eroding channels. City and County crews removed in excess of 10,000 tons of sediment from the City this summer.

Stabilizing the alluvial fans has been a significant step taken in mitigating post-wildfire flooding and has been true for the Schultz Flood Area. Unfortunately, the topography of the Spruce Avenue drainage does not include as much alluvial fan acreage, but the goal will be to stabilize and restore those fans to the maximum degree possible to reduce the production and transport of sediment. One project the District constructed in 2020 on the USFS land above Mt. Elden Estates has already risen 6' feet with sediment and rocks from the burn area, but much more of this work must be done to support successful mitigation within the City.

The District has formally requested long-term Emergency Watershed Protection Program (EWPP) funding from the Natural Resources Conservation Service (NRCS) to restore and stabilize the alluvial fans both on and off U.S. Forest Service land, along with other measures that are necessary to further mitigate flooding in the Mt. Elden Estates area. The NRCS will be conducting a damage survey soon and based upon that survey will decide if to submit a formal request to the federal NRCS for funding.

The current rough estimate for this critical work is approximately $7 million. Currently the long-term EWPP fund at the national level is not funded, but Rep. O'Halleran and Senators Kelly and Sinema are taking actions in the House and Senate to support funding this crucial program. According to the NRCS, a major obstacle to performing this work on Forest Service property is that a rule was created in 2014 that prohibits EWPP funding to be used on Forest Service property. The District is working with our Congressional representatives to modify or address in some way this serious obstacle since the vast majority of this work must be done on Forest Service land.

3) Evaluate the Feasibility of Constructing a Secondary Underground Floodwater Conveyance. Evaluate the feasibility of constructing a secondary underground conveyance (pipe) from

above Linda Vista to below Rt. 66 to expand the level of floodwater that can be safely conveyed through the City neighborhoods impacted by Museum floodwater. Although there is some ability to expand the current channel and stormwater system, there is a need to expand the entire conveyance system to carry a greater amount of post-wildfire floodwater including the sediment that cannot be reduced.

This is a major effort that will require significant investment not only to evaluate the feasibility, but if feasible to engineer and construct. It is likely that if this is determined to be feasible, then the major challenge will be funding to engineer and construct this new conveyance. A key issue that must be considered and thoroughly evaluated is what are the upstream and downstream impacts of constructing an additional conveyance. Likely this conveyance will require additional detention or retention facilities south of Rt. 66 so that impacts of flooding are not transferred downstream.

The City will lead this process given City leadership will ultimately have to decide the level of mitigation that is feasible considering technical, financial, legal, and environmental criteria. The first step is allocating the funding to secure an engineering firm to conduct the foundational drainage study that will underlie the decision as to the level of mitigation that can be achieved and the feasibility evaluation of all projects. Given the volume of floodwater and sediment, the level of flood mitigation will very likely be limited to those storms that are more frequent and of a lower volume of water and will not address the large-scale rainfall events like the one on August 17th. However, the goal of the long-term mitigation is to reduce the impacts of the larger rainfall events knowing it is very unlikely that all flooding can eliminated.

4) Evaluate the Feasibility of Expanding the Current Conveyance. The current conveyance (channel, culverts and storm drain inlets) within the City was designed to meet a 100-year pre-wildfire rainfall event. Engineers at the Summit identified that some additional capacity to address flooding may be achieved by expanding the current conveyance. As noted above, the same concern with upstream and downstream impacts must be considered as the City moves through evaluating the feasibility of expanding the current system. Similar to a new conveyance, the expansion of the existing system will first need to be evaluated for feasibility (also in light of any new secondary conveyance) and if feasible, then move into engineering then construction. Certainly, as with any major infrastructure project, issues can arise during engineering that can sideline a project as well.

Long-Term Mitigation Project Funding

Are the District and City seeking funding for long-term mitigation projects?

As noted above, the District is already seeking long-term EWPP funding for addressing the large volume of sediment that will be critical to any future infrastructure projects in the City. There is no guarantee of funding nor the ability to use these funds on Forest Service land.

The District is preparing to submit a Notice of Interest (NOI) for FEMA's Building Resilient Infrastructure and Communities grant program for a project just upstream of the City boundary. The City is considering this grant option as well.

We understand from AZDEMA that there may be other FEMA Hazard Mitigation Grants Program (HMPG) funds made available through competitive processes, and if so, then we will evaluate those opportunities and likely pursue those as well. However, these grants only cover up to 75% of the eligible costs of a project and thus local funds (cannot use federal funds to match federal funding) will need to be identified to fund the grant matches and to fund costs that are not deemed eligible. These grant programs are extremely competitive and with this year's fires, flooding, and hurricanes it will be very challenging to compete for these funds.

We will continue to update residents as we progress through the steps outlined above to pursue long-term flood mitigation.

The Engineering Summit was an important process that has laid the foundation for developing a long-term mitigation plan. This process is very complex and challenging and will take much longer than we or anyone will like, but we ALL must work together as a team to secure the funding and diligently march through the steps and hurdles that will inevitably arise. Many details and obstacles are ahead of us…we hope you will work with us to forge ahead with determination and focus.

Q: How much has the District spent on flood mitigation and response since the Museum Fire?

A: The District has spent over $4 million on Museum Flood mitigation and response since 2019 and the City has spent over $1 million on response this summer. For the District, this expenditure represents a year's worth of property tax revenue from throughout the entire District / County and the District remains responsible for addressing flood impacts in the unincorporated areas.

Disaster Declarations

Q: How does a Presidential Declaration work?

A: There has been much confusion about what a Presidential Declaration means. First and foremost, a Presidential Declaration cannot be pursued by a County or City, it must be pursued by a State. The State (in this state the AZ Dept of Emergency and Military Affairs (AZDEMA) at the direction from the Governor) pursues the federal declaration so that the State can be reimbursed the costs it is experiencing associated with disasters within the state, including the counties and cities requests for reimbursement through local and state declarations. Thus, the County and City are not experts in this arena and questions should be emailed to the AZDEMA Public Information Office at Recovery.Info@azdema.gov. That said, we do cooperate with AZDEMA as they evaluate whether or not during a certain period of time expenditures exceed their threshold for requesting a federal declaration, but it is entirely their decision and process. AZDEMA has indicated that this Presidential Declaration will be in response to losses of public infrastructure. However, we do know that a federal declaration does not result in what is termed FEMA Individual Assistance, which means that individuals with impacts from a disaster do NOT receive any direct assistance from FEMA. FEMA's threshold to meet the provision of Individual Assistance is very large in terms of the total number of homes completely destroyed, and nothing significant enough occurred within this County to meet the threshold required.

Furthermore, we understand that many believe that the resulting impacts from the August 17th flood event should quality as a federal disaster, given the impact on the Flagstaff community and others throughout the state. Per our conversations with AZDEMA, our costs are not close to the +-$9.9 million threshold necessary to request a federal declaration for this date. If there are further questions, then you may email the AZDEMA Public Information Office at Recovery.Info@azdema.gov.

Q: How does the Federal Major Disaster Declaration affect the Museum Flood Area?

A: The Federal Major Disaster Declaration announced on August 13, 2021, by the Biden Administration applies to Coconino, Navajo, and Apache counties related to emergency events from July 22-24. This declaration is a mechanism for the state to recover funds from the federal government for their response efforts. It will have an indirect impact on Coconino County and the City of Flagstaff with a potential for some funding to address flood impacts only to public infrastructure that occurred within this timeframe. Flood impacts to public (city's) infrastructure during July 22 – July 24 did not occur within the Museum Flood area. Furthermore, the Presidential Disaster Declaration is based on impacts to public infrastructure across the three counties and does not result in the ability for individuals impacted by flooding to secure FEMA Individual Assistance nor SBA low-interest disaster loans. DEMA or FEMA should be contacted for additional information on this declaration.

The District and the City do appreciate the support from Senators Kelly, Sinema and Representative O'Halleran with securing the Presidential Disaster Declaration and their continuing advocacy for securing grants and other funding streams to address the long-term mitigation needed in the Museum Flood Area.

Q: What is Public Damage Assessment (PDA)?

A: Preliminary Damage Assessments (PDAs) are conducted to enable FEMA — as well as state, local, tribal, and territorial partners — to determine the magnitude of damage and impact of disasters.

Q: Have PDAs been completed for this summer's monsoon flooding in the Museum Flood Area?

A: Yes. All PDAs, paperwork, and necessary steps have been completed as required to date. All deadlines have been met, and the approaching deadlines are being very closely monitored by County the District and the City.

Q: Are PDAs required to qualify for federal assistance?

A: Yes.

Q: What is Public Assistance (PA)?

A: Public Assistance (PA) is for government owned infrastructure. It is NOT for individuals / homes ("the public") or personal loss.

Q: What is Individual Assistance?

A: There are 2 Individual Assistance (IA) programs that can, after meeting significant thresholds, assist citizens with restoration of basic needs. These two programs DO NOT offer the ability for "whole restorations." To the best of our knowledge, Arizona has never received IA from either program.

The FEMA IA program allows for some reimbursement for individuals having significant losses. Typically, the maximum amount of reimbursement is less than $35,500. The threshold to trigger FEMA IA is very high.

Q: What is the Small Business Administration (SBA)?

A: The Small Business Administration (SBA) Declaration is a program that offers long term, low interest loans for restoration of basic needs during disasters that meet certain thresholds. There are

some variables to the thresholds for the SBA program (rent vs own, placement in an identified flood zone etc.), which include the following:

- Major damage (as defined by SBA) to 25 homes and/or businesses that have uninsured loses valued at more than 40% of replacement or pre-disaster fair market value. Traditionally, in a flooding event, upwards of 18 inches to 2 feet of water standing in a residence / business, is necessary for “major damage”. This year’s Museum area flooding caused some major damage in a few locations, but the data is still being assessed.

As we had expected, the SBA has made the determination that the Museum Flood Area DOES NOT Meet the thresholds for SBA long-term/low interest loan assistance.

Q: What is the purpose of the Mt. Elden Estates NRCS Exigency Project?

A: Completed in early August 2021, the Mt. Elden Estates NRCS Exigency Project will decrease serious erosion from repetitive flooding that is destroying private properties, roads and threatens area homes. This erosion also sources sediment, which is then transported downstream and negatively impacts downstream infrastructure and homes. The District was able to secure $600,000 in exigency funding from the Natural Resources Conservation Service (NRCS) for this emergency channel stabilization project on July 30. This represented 75% of the project's cost with the District providing a 25% match of $152,000.

Q: How long has the District been analyzing the flood threat in the Museum Flood Area?

A: The District was analyzing the threat to the Museum Flood Area almost since the Museum Fire started on July 21, 2019. The fire ultimately charred 1,961 acres, including a significant portion of the Spruce Avenue Watershed, much of it severely or moderately burned, which left the soil hydrophobic (unable to absorb water and will shed water rapidly as if it was glass). Within 24 hours of the fire’s start, the District’s staff and consultants began analyzing the expected flood impacts using state-of-the-art technology and applying the lessons learned from both the Schultz Fire and Flood and Slide Fire and Flood experiences. Fortunately, an earlier FEMA-funded County study had evaluated the potential risk of post-wildfire flooding in the area that burned, and the scientific flood model was easily updated, the results of which then drove the flood mitigation plan.

Q: Is the Museum Flood Area still at high risk for flooding?

A: Yes. In early 2021 the technical consultant hired by the City and District recently validated the original model used to gauge flood risk in the Museum Flood Area. The original model generated in 2019 determined that the flood risk was increased ten-fold over pre-wildfire conditions. Our consultant was able to review the limited number of rain events impacting the Museum Burn Scar over the last two years and determine that the original model was still valid.

As we learned during the flood events of the very active 2021 monsoon season, the threat of flooding remains real, and you should keep your sandbags and any other mitigation measures in place. This science-based model indicated that the moderate- to high-burn severity sections of the watershed have experienced very little natural recovery over the last two years and will pose a serious flood threat to over 400 homes and 50 businesses in the Museum Flood Area for years to come.

Emergency Flood Mitigation Measures

Q: Do I need sandbags or barriers for my property?

A: If you are within the Museum Flood area but have not received mitigation and feel that you may need it, then you can call 928-679-8525 to schedule an engineering assessment.

Q: Should I regularly inspect and maintain my sandbags?

A: Yes. The City and District strongly encourage all property owners to keep their sandbag structures in good condition. Sandbags are susceptible to the elements, especially the ultraviolet (UV) rays of sunlight, and should be replaced if torn. Over time all sandbags will need to be replaced. Before the 2021 monsoon season, the City / District team conducted an evaluation of current in Museum Flood Area neighborhoods and found that, after less than two years, 30% - 40% of sandbags were deteriorated and needed to be replaced prior to monsoon season.

For more information on sandbag walls and other flood preparation resources, please visit www.coconino.az.gov/MuseumFire/FloodArea.

Q: Where can I find sandbags?

A: A self-fill sandbag station is located in the lot just north of Coconino County Health and Human Services, 2625 King Street. Filled sandbag are available in the lot just south of Health Services behind Cal Ranch. For more information, please visit https://www.coconino.az.gov/2134/Sandbag-Information.

Q: What if I need help with shoring up my sandbags?

A: There will be a process similar to the last two years to shore up flood mitigation prior to the next monsoon season, which will include placing sand bags in the neighborhoods for use by the residents. As with prior years, residents who are elderly or disabled can contact the Museum Flood Call Center next spring at 928-679-8525 to request assistance.

Q: Why does the system of emergency flood mitigation measures need to be contiguous?

A: The placement of flood mitigation in your neighborhood was based on science designed to help mitigate the impact of post-wildfire flooding to downstream residences and businesses. Because of the nature of water, flood mitigation should be contiguous – not piecemeal - with no gaps. The mitigation installed in the Museum Flood Area was mostly designed to convey floodwaters downstream and out of your neighborhood. Removal of any section of this mitigation – sandbags or barriers - from an individual property may compromise the effectiveness of this system and could result in adverse flooding effects on adjacent properties, for which the private property owner who removed the mitigation could be held responsible for any damage.

Q: How long will flood mitigation be in place around my property?

A: The emergency flood mitigation measures that have been installed by the District should probably remain in place for at least the next three to five years. This also depends on our ability to secure funding and then implement long-term flood mitigation measures.

Q: Should I install berms, ditches, or other measures on my property to divert floodwaters?

A: Efforts by property owners or tenants to keep water off their property could have consequences for their neighbors and result in liability for the person diverting the water. The law in Arizona regarding water diversion is based primarily on court decisions rather than statute. Different rules apply depending on whether the water that is diverted is surface water, flood water or water that has been previously captured in a stream or water course.

It is important to be careful that your mitigation efforts do not increase the flood hazard to your neighbors both upstream and downstream. You may be legally liable for damage. Neither the District nor the City can consult as to the legality or illegality of water diversion on private property.
The Arizona Attorney Magazine published an article by attorney David L. Abney that has a good summary of water diversion law in Arizona. This article is available in the County's Law Library and can be found on the Museum Fire / Flood web page at www.coconino.az.gov/MuseumFire/FloodArea.

Before a Flood Emergency

Q: How should I prepare for a flood emergency?

A: Severe monsoon storms and post-wildfire flooding can occur with little or no warning. There are several important steps that you can take to prepare you, your family, and your property from monsoon flooding:

- **Secure Flood Insurance:** The District **strongly encourages** all property owners in the Museum Flood Area to purchase and maintain flood insurance and take other suitable

precautions to protect their properties and themselves from injury due to flooding. Please also note that the only way to protect your investment either as a tenant or property owner is to purchase a separate flood insurance policy. If you are renting a home, then consider purchasing renter's insurance to insure your belongings. For information about the National Flood Insurance Program (NFIP), please call 1-800-427-4661 or visit www.floodsmart.gov

- **Sign Up for Emergency Alerts:** Sign up for emergency alerts at https://coconino.az.gov/207/Emergency-Management.

- **Track Weather:** For the latest Museum Fire scar weather conditions and NWS notifications during monsoon season please visit https://www.weather.gov/fgz/MuseumFireFloodRisk.

- **Know the Alert Process:** Be sure that you, your friends, and your family know the "Museum Flood Area Emergency Alert Process," which is available at www.coconino.az.gov/MuseumFire/FloodArea.

- **Review the Flood Guide:** the most recent (2021) Museum Flood Preparedness & Mitigation Guide, which is available on the web page and directly at www.coconino.azgov/2021MuseumFloodGuide, has information to help keep you and your family aware, informed, and safe during monsoon season.

During a Flood Emergency

Q: What should I do in a flood emergency?

A: The risk of flooding from the Museum Fire will exist for years to come. As such, it is imperative to stay aware and prepared for flood emergencies. Some critical points for your safety include the following:

- **Shelter in Place:** During flood events, residents should shelter in place. Have a Stay Kit ready.

- **Stay Out of Drainages:** Do not enter drainages at any time, even if they're dry.

- **Keep Kids Out of Drainages:** Don't let your children play in drainages at any time, even if they're dry.

- **Get to High Ground:** If outdoors, then get to high ground or go into your home.

- **Know Where your Kids & Pets Are:** Know where your children and pets are all times.

After a Flood Emergency

Q: What should I do after a flood emergency?

A: There are several things you need to do as soon as possible after a flood, including:

- **Document all flood damage:** Take photos of any flood damage to your property as soon as it is safe to do so. Do this documentation before conducting any cleanup work to create an accurate record for insurance records, etc.

- **Contact Insurance Company:** Contact your insurance company or the NFIP (1-800-427-4661) as soon as possible.

- **Avoid floodwaters, washes, and impacted areas**

- **Debris on Property:** If you have debris on your property, then you should move the debris to the street if you are able -- only when the water has stopped flowing. This will help County and City Public Works crews remove the debris with their heavy equipment.

- **Parked Cars:** If you live on one of the streets that has debris as a result of the flood, then please do not park your car on the streets.

- **Museum Flood Area Call Center:** The Call Center will be operational as needed. Hours of operation may shift depending on any weather events that may occur. The number is 928-679-8525.

- **Social Services Resource Guide:** COVID-19 Social Safety-Net Services Coalition-Resource Guide V10 (az.gov).

- **Cleanup of Interior Flooding:** https://www.coconino.az.gov/2437/After-a-Flood-Event.

- **Test for Mold:** Mold test kits are available at home improvement stores like the Home Depot for approximately $10.00.

- **For more information**: Please visit www.coconino.az.gov/MuseumFire/FloodArea.

Q: What is the Home Repair Program?

A: The City, working with Housing Solutions and with funding from United Way of Northern Arizona and the Arizona Community Foundation (ACF) have initiated a home repair program for interior impacts from flooding this past summer throughout Flagstaff. The funding underlying the program is coming from donations being made to UWNA and ACF. The City conducted damage assessments and the homes that experienced interior flooding were sent an application for this program on September 3. The applications were due by September 22 and will be reviewed on September 27th. Further review of any additional applications will take place at a later time.

Q: How can I volunteer?

A: United Way of Northern Arizona is continuously reaching out for volunteers to help with sandbag wall repair, post-flood debris removal, and other jobs. If you are interested in volunteering, then please visit https://uwna.volunteerhub.com/.

Q: Where can I find more information about the Museum Flood Area, flood preparedness and flood response?

A: Much more information is available at www.coconino.az.gov/MuseumFire/FloodArea and in the 2021 Museum Flood Guide, which is available at www.coconino.az.gov/2021MuseumFloodGuide.

Causes of Post-Wildfire Flooding

Q: What causes post-wildfire flooding?

A: Wildfires can dramatically change landscape and ground conditions, which can lead to increased risk of flooding. Most of the trees and vegetation within the 1,961-acre Museum Fire scar are now gone, so there is no organic material to provide both deflection and absorption of rainwater. In addition, the fire burned much of the soil in the Spruce Avenue Watershed. High intensity wildfires can leave soil “hydrophobic.” This means that, like a piece of glass, the soil is now unable to absorb water and will rapidly send rainwater downstream. 52% of the Spruce Avenue Watershed’s soils burned at high or moderate burn severity, which means they will act like a sheet of glass or slough off sheets of soil creating debris flows.

Q: What factors contribute to post-wildfire flash flooding danger?

A: The biggest threat from wildfire, both in terms of life/safety and property, comes from post-wildfire flash flooding. As Museum Flood Area residents experienced during 2021 monsoon season flood events, the factors that contribute to post-wildfire flash flooding danger include the following:

- **Rainfall Extent:** The extent of the rainfall over the burn scar, the intensity of the rainfall and the duration of the rainfall are key factors that influence the size of the flood event.

- **Flow Size:** The size of post-wildfire floodwater flows from a rain event can be five to 10 times greater than normal. This was the case with flooding following the 2010 Schultz Fire. For example, a 25-year rain event on the Schultz burn scar created nearly a 1,000-year flood event.

- **Flow Consistency:** Post-wildfire flows are much more than just water…they carry sediment and burn debris that can clog and overflow drainages in a very short period. The dense water can carry large debris and rocks into the neighborhoods, which increases the danger.

- **Monsoon Season:** Post-wildfire flooding typically occurs during monsoon season, which runs from early summer through late fall. Our annual monsoon season can produce intense, localized storms that appear with little or no warning and can range dramatically in size. In a fire-affected area, even a small monsoon storm can cause dangerous flood conditions. Remember: Just six inches of floodwater can knock down an adult and 18 inches can carry away a vehicle.

For more information on flood risk, please review the Museum Flood Risk Advisory," which is available at www.coconino.az.gov/MuseumFire/FloodArea.

Q: Why did the District and the City of Flagstaff originally install emergency flood mitigation measures in 2019?

A: In 2010, the Schultz Fire created catastrophic flooding in the downstream neighborhoods of Timberline, Fernwood, and Doney Park. Two lives were lost as a result of the flooding and NAU's Rural Policy Institute estimated the economic impact at over $100 million. During the first monsoon season after the fire, there were upwards of 23 major flood events in this area. The next four years saw additional extensive flooding. The District worked tirelessly to implement initial emergency flood mitigation measures, as it is doing now within the neighborhoods that will be impacted by post-wildfire flooding from the Museum Fire.

Based on the County's/District's experience with the Schultz flooding, the Federal Emergency Management Agency (FEMA) funded the County to conduct a post-wildfire flooding study of the entire

county in 2015. The study identified the Spruce Avenue Watershed, the watershed burned by the Museum Fire, at risk for severe flooding after a wildfire. This was the case because of the steep slopes and poor, overgrown condition of the forest in the Dry Lakes Area. The City of Flagstaff already had plans to thin and restore the forest in the Dry Lakes area, but unfortunately only 40% of that work was completed when the Museum Fire started. The modeling showed severe and repetitive flooding. Thus, the District immediately began working with residents to install emergency flood mitigation measures.

Given the serious flood events of the 2021 monsoon season, it is very important to note that, had this emergency mitigation not been installed, the impacts from these flood events to home, businesses, and infrastructure would have been exponentially worse.

Q: What neighborhoods can be affected by flooding from the Museum Burn Scar?

A: The Museum Flood area includes the neighborhoods of Mt. Elden Estates and Lockett Ranches in the County and the neighborhoods of Paradise Road, Grandview Avenue/lower Monte Vista, and Sunnyside within the City.

Q: How can I get flood warnings and information?

A: There are several great resources to help keep you aware and informed during monsoon season:

1. **County Emergency Notifications:** Coconino County has a free Emergency Notification service that alerts residents and businesses about time-sensitive general and emergency situations – including wildfires, thunderstorms, tornadoes, and flash flooding – that can impact our region throughout the year and especially during monsoon season. Users can receive the latest updates on home and cell phones or via text and e-mail messages. Sign up at www.coconino.az.gov/ready.

2. **National Weather Service & Rain Gauge Data:** The National Weather Service (NWS) also has a web page at https://www.weather.gov/fgz/MuseumFireFloodRisk that has current storm and flash flood warning information. For radar and rain gauge information in the Museum Fire Burn Scar area, please visit https://coconino.jefulleralert.com/jefmap/.

   You can also get NWS weather information on Facebook at
   https://www.facebook.com/US.NationalWeatherService.Flagstaff.gov
   and
   Twitter at https://twitter.com/nwsflagstaff

3. **Social Media:** For those with smart phones and PC's, social media is a great way to keep apprised of flood-related information and associated County response activities. We

encourage everyone who uses social media to “Like” Coconino County on Facebook and to “Follow” us on Twitter: https://www.facebook.com/CoconinoCounty

4. **Weather Apps:** There are many weather apps available for your smart phone to provide storm, radar, and current condition information. Google “weather alert app” for more information.

5. Please review the “Social Media and Important Links” document, which is available at www.coconino.az.gov/MuseumFire/FloodArea.

Q: What is the District’s role and responsibility on private roads during a flood event?

A: The District does not have legal authority to maintain private roads and driveways. However, after an emergency flood event if a private road is impassable, then the District will make private roads open and passable within reasonable efforts.

Q: Who is responsible for keeping alleyways clear?

A: As part of its response effort, the City of Flagstaff has identified and prioritized alleyways in Sunnyside that are subject to flooding and is taking steps to remove debris and vegetation. The City also is working to identify public utility and drainage easements in these alleyways. However, as property owners and residents also are responsible for maintaining alleyways, the City appreciates any assistance from the public towards keeping alleyways free of debris that could be washed away in a flood event. Please note that the owners and/or the residents of homes are responsible to keep the alleyway behind their respective homes clear to the midpoint of the alley. At the midpoint, it is the responsibility of the homeowners on the other side of the alley.

Q: Where can I get more information?

A: For more information, please visit www.coconino.az.gov/MuseumFire/FloodArea or email museumfloodinfo@coconino.az.gov.

Q: How can I get email updates regarding the Museum Flood Area?

A: If you would like to receive email updates from our team, then please email us at museumfloodinfo@coconino.az.gov with “Add me to the Museum Flood Info Email List” in the subject line.

Q: How can I test for mold?

A: Mold test kits are available at home improvement stores like the Home Depot for approximately $10.00.

Q: Is flood-related social services information available?

A: Yes. A listing of available social services can be accessed at www.coconino.az.gov/SocialServicesResourceGuide. Some residents are reporting issues with their landlords related to either addressing flooding impacts or evictions. No-cost or low-cost legal services are available to those that are eligible through DNA Legal Services, which can be contacted by calling 833-362-1102 or 928-774-0653 or on-line at www.dnalegalservices.org or at their Flagstaff office at 2323 E Greenlaw Lane, Suite #1, Flagstaff.

Q: After monsoon season ends, are there any concerns for "off-season" flooding?

A: Off-season flooding has not been experienced in post-wildfire areas. However, rain-on-snow events on a burn scar could potentially cause flooding.

Q: Can the District help me with questions about flood insurance?

A: The District is not an expert on flood insurance. If you have general questions about flood insurance, then please submit those to museumfloodinfo@coconino.az.gov. The District will work with FEMA Region 9 to get answers. However, any specific questions about your flood insurance policy or your specific impacts and applicability must be discussed with either your insurance agent or with the National Flood Insurance Program (NFIP). To contact the NFIP please call 1-800-427-4661 or visit www.floodsmart.gov.

Q: Can the District remove sandbags and barriers at the end of monsoon season and replace it prior to the beginning of the next flood season?

A: No. It is not logistically or financially feasible to remove & replace emergency flood mitigation like sandbags and barriers each season.